Physiological effects on re-growth of forage sorghums ratoon crop under varying salinity and irrigation frquency

Abstract

The responses of forage sorghum [Sorghum bicolor (L.) Moench] varieties to salinity and irrigation frequency were studied from January to December 2009. Two salt tolerant varieties of forage sorghum namely Speedfeed and KFS4 were grown under salinity levels of 0, 5, 10, 15 dS m-1 and irrigated when the leaf water potential reached -1(control),-1.5 and -2 MPa. Salinity and irrigation frequency significantly ($P \leq 0.01$) affected leaf water potential, chlorophyll content, photosynthetic rate, stomatal conductance and stomatal size. Though both varieties were sensitive to salt and water deficit the KFS4 variety had 10.7, 8.2, 6.1 and 4 percent higher leaf water potential, chlorophyll content, photosynthetic rate and stomatal conductance, respectively compared to Speedfeed, hence KFS4 is more tolerant to stress conditions compared to Speedfeed. Combination effect of high salinity and low water availability had an adverse effect on stomatal conductance. When irrigation was delayed from the leaf's water potential of -1 to -2MPa, the chlorophyll content, photosynthetic rate and stomatal conductance were decreased by 26.8, 10.1 and 28% respectively. The highly significant declined was mostly at -2 MPa irrigation frequencies, it means irrigation of forage sorghum can be delayed till leaf water potential reaches to -1.5 MPa, which takes about two weeks time. The number of stomata and the size of their apertures determine the extent of gaseous exchange and hence the photosynthetic potential. The number and dimension were less in the treated plants.

Keyword: Salinity; Irrigation frequency; Physiology; Stomatal size; Photosynthesis; Sorghum